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~~E73-10364~~

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Bi-Monthly Progress Report

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Period: January 1 to February 28, 1973

A. Title of Investigation: A Study of the Utilization of ERTS-1
Data from the Wabash River Basin

B. Principal Investigator: D. A. Landgrebe
GSFC Number UN127

C. Problems: Adequate ERTS-1 test site data is now available for each of the analysis tasks defined for the contract. Only the technology development project to compare bulk (system) processed data quality to precision (scene) processed digital data has encountered a problem in that precision (scene) processed data is not yet available for analysis. The problem lies both in obtaining the data and developing software to reformat the precision CCT for use in the LARS system.

D. Accomplishments

Crop Species Identification and Acreage Estimations: Qualitative examination of classification maps indicate training sets may be successfully extended beyond the 15 to 25 miles already demonstrated. Analyses utilizing temporal information were conducted. However, data from the end of the growing season (September 14 and October 2) did not improve classification performance of corn and soybeans over using only August 9 data, which is considered to be an optimum time for identification of those two crops. Recognition of "other", however, was increased 10 percent. Cooperative research with the Statistical Reporting Service of the U.S.D.A. was initiated during the period.

Mapping of Soil Associations: Work for this period involved mapping of soil associations in Tippecanoe County, Indiana and Daviess County, Indiana. Data used: Scene ID 1088-16050 October 19; 1105-15595 November 5; and 1124-16052 November 24. Three soil associations were mapped with 55% accuracy in Tippecanoe County using October data. Soil associations were less separable using November data. Daviess County studies are not completed. Conclusions from these analyses are that this time of year is sub-optimal for mapping soil associations, as very little plowing had been done.

Urban Land Use Analysis: Refinements were made in the land use classification for the cities of Milwaukee, Chicago, and Indianapolis reported in the Type II semi-annual report of January 30, 1973. A paper was prepared describing this work to be presented at the NASA ERTS Review, March 6, 1973.

(E73-10364) A STUDY OF THE UTILIZATION
OF ERTS-1 DATA FROM THE WABASH RIVER
BASIN Bimonthly Progress Report, 1 Jan.
- 28 Feb. 1973 (Purdue Univ.) 3 p HC
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3 pp.

Earth Surface Feature Identification: Work continued on the collection of land use data for grid cells in Tippecanoe County, Indiana for use as input to the GRID analysis program. No results are reported at this time.

Water Resource Research: No progress is reported on this task at this time.

Atmospheric Modeling: Based on one case thus far, a study of the effects of computational parameters Δx and r_{\max} upon expected radiance at satellite altitude has revealed the following: 1) particles greater than 1 micrometer in radius need be included in the atmospheric model only if accuracies of 1 percent are required; 2) a value of $\Delta x = 0.5$ will produce up to 3 percent variations in predicted intensity when compared with a more accurate computation.

Reformatting and Overlay: Software development continued for reformatting scene corrected CCT data from the complex block format produced by NDPF to the LARS raster line format. One test tape is available for checking the software. A total of 35 frames of bulk (system corrected) CCT data was reformatted to the LARS format during the period.

Temporal overlay of sequential ERTS CCT data over the same area was carried out for two sites. Three frames covering the Lynn County, Texas area were overlayed forming a 12 channel spectral/temporal data set. The data was taken on October 9, 1972 -- frame 1078-16524; November 15, 1972 -- frame 1114-16532; December 2, 1972 -- frame 1132-16532. The overlay accuracy is very high, less than one sample misregistration, due to the high correlation of this data. The second site was the northern Illinois area previously overlayed. A third frame from September 14 was added to the two time overlayed. A third frame from September 14 was added to the two time overlay previously accomplished. The twelve channel spectral/temporal tape covers primarily DeKalb and Ogle Counties. Work is also proceeding on techniques for correcting scale factors, skew distortion and for overlaying ERTS data onto a geographic coordinate system.

Analysis Technique Development: Work continues on the tasks defined for this project. No results are reported at this time.

Comparison of System Corrected and Scene Corrected CCT Data: A thorough study of the details of the scene processing operations of the NDPF continues in preparation for a comparative analysis of scene versus system corrected CCT data. Scene corrected data has been requested for a test site. Planning for overlay of the system corrected CCT data onto the scene corrected data was carried out.

E. Significant Results: Preliminary acreage estimates for corn, soybeans, and "other" cover types made from classifications of ERTS data compared well with those made by the U.S. Department of Agriculture.

Registration of multiple frames of ERTS CCT data over Lynn County, Texas and DeKalb County, Illinois was achieved to a high degree of accuracy. Spectral/Temporal computer pattern recognition analysis was carried out for the first time using satellite data.

F. Publications: Papers were prepared describing crop recognition and urban land use analysis work for the ERTS review in March 1973. These papers will be listed in the March - April Type I report.

G. Plans for Next Period: Crop recognition analysis will be performed on frame 1052-16052 obtained on August 13, 1972 covering eastern Missouri.

Study of additional parameter values for the atmospheric model will be conducted including several wavelength values and two different aerosol compositions.

H. Other Items: No changes in standing order forms were made and no image descriptor forms were completed during the period.